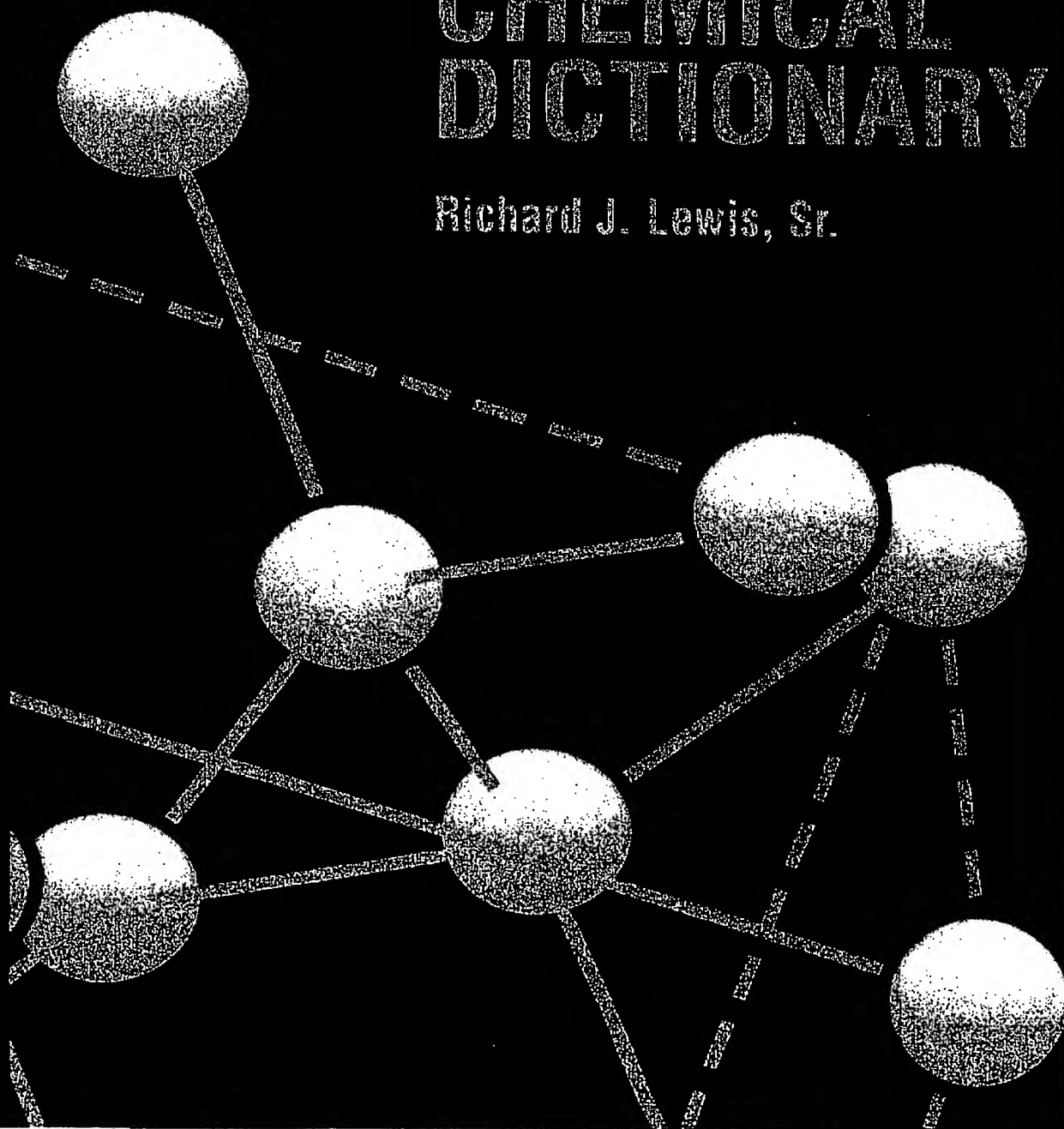


Twelfth Edition

Hawley's CONDENSED CHEMICAL DICTIONARY

Richard J. Lewis, Sr.



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QUARTZ, FUSED

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Derivation: Synthetic crystals of good size and purity are grown by mass production methods under very carefully regulated conditions of temperature and concentration.

Hazard: Avoid inhalation of fine particles. TLV: (for respirable dust) 10 mg/m³/‰ respirable quartz + 2.

Use: Electronic components, piezoelectric control in filters, oscillators, frequency standards, wave filters, radio and TV components; barrel-finishing abrasive.
See also silica.

quartz, fused. Pure silica that has been melted to yield a glass-like material on cooling.

Use: For apparatus and equipment (such as vacuum tubes) where its high melting point, ability to withstand large and rapid temperature changes, chemical inertness and transparency (including UV radiation), and electrical resistance are valuable. Produced as fibers and fabrics for heat resistance, low expansion coefficient, and insulating value.

See also glass.

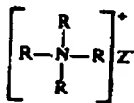
quassia. (bitter ash; bitterwood).

Derivation: The wood or bark of *Picrasma excelsa* or *Quassia amara*.

Properties: Very bitter taste, white to bright yellow chips or shavings.

Use: Decoction or tincture as a fly poison, surrogate for hops, medicine (anthelmintic), hair lotion, flavoring, alcohol denaturant.

quaternary ammonium salt. A type of organic nitrogen compound in which the molecular structure includes a central nitrogen atom joined to four organic groups (the cation) and a negatively charged acid radical (the anion). The structure is indicated as:



Octadecyldimethylbenzyl ammonium chloride and hexamethonium chloride are examples. Pentavalent nitrogen ring compounds, such as lauryl pyridinium chloride, are also considered quaternary ammonium compounds. They are all cationic surface-active coordination compounds and tend to be adsorbed on surfaces.

Use: Disinfectant, cleanser and sterilizer, cosmetics (deodorants, dandruff removers, emulsion stabilizers), fungicides, mildew control, to increase affinity of dyes for film in photography, coating of pigment particles to improve dispersibility, to increase adhesion of road dressings and paints, antistatic additive, biocide.

See also detergent, synthetic, coordination compound.

p-quaterphenyl. C₆H₅C₆H₄C₆H₄C₆H₅.

Properties: Crystals, mp 316–318°C, bp 428°C (18 mm Hg).

Grade: Purified.

Use: As primary fluor or as wavelength shifter in soluble scintillators.

quebrachina. See yohimbine.

quebracho.

Properties: A wood-derived tannin, the most important tanning agent used in the American leather industry. Combustible.

Derivation: From *Aspidosperma quebracho* and *Quebracho lorentzi*, imported as logs from Argentina.

Grade: Liquid: 35–37% tannin. Solid: 65% tannin.

Use: Vegetable tanning, retanning of chrome-tanned upper leathers, dyeing, ore flotation, oil well drilling fluids, flavoring.

Queliet reaction. Passage of dry hydrogen chloride through a solution in ligroin of a phenolic ether and an aliphatic aldehyde in the presence or absence of a dehydration catalyst to yield α-chloroalkyl derivatives by substitution in the para position to the ether group or in the ortho position in para-substituted phenolic ethers.

quench. In the terminology of metallurgy, quick cooling of metals or alloys by immersion in cold water or oil. This is an essential part of the tempering process, especially for steels. If the metal or alloy is in the liquid (molten) state, and the quench time is extremely short (less than a second), the product will have an amorphous or glass-like structure, because no crystallization occurs.

See also glass, metallic.

quercetin. CAS: 117-39-5. C₁₅H₁₀O₇.

Properties: Yellow needles (dihydrate), anhydrous form decomposes at 315°C, soluble in alcohol and glacial acetic acid, insoluble in water.

Derivation: Bark of fir trees, also synthetically.

Use: Medicine, reported formation of epoxy resins on mixing with epichlorohydrin.

"Questex" [Stauffer]. TM for ethylenediamine-tetraacetic acid (EDTA) and derivatives, a group of polyamino-acid-based organic sequestering agents that complex or chelate multivalent, metallic cations (such as calcium, magnesium, copper, and iron) into stable, coordinated anionic complexes.

quick-. Prefix meaning alive or active, as in quicksilver (mercury), quicklime (unslaked

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POLYACRYLONITRILE

are based on vegetable waxes (carnauba and candelilla), combined with softeners, fillers, and pigments or emulsified in alcohol or other solvent. Furniture polishes often contain red oil, lemon oil, and petroleum solvent; most types of metal and wood polish contain organic solvents, and, hence, are flammable liquids. Nail polishes are nitrocellulose lacquers, usually with amyl acetate solvent.

See also electro-polishing.

Hazard: May be flammable.

(2) The hard outer coating of cereal grains, especially rice, which is usually removed in processing. These coatings are rich in vitamin B₁. Their removal robs the cereal of much of its nutritive value.

pollucite. $\text{Cs}_4\text{Al}_4\text{Si}_3\text{O}_{26} \cdot \text{H}_2\text{O}$. A natural cesium aluminum silicate found in pegmatites.

Properties: Colorless, Mohs hardness 6.5, d 2.9.

Use: Source of cesium, catalyst, fluxes, welding materials, ion propulsion, thermocouple units.

pollution. Introduction into any environment of substances that are not normally present therein and that are potentially toxic or otherwise objectionable. The most serious atmospheric contaminants have been (1) sulfur dioxide evolved from the fuels used in electric power production and industrial processing, and (2) automobile exhaust gases rich in carbon monoxide and tetraethyllead residues. The former is being alleviated by mandatory use of low-sulfur fuels and the latter by elimination of tetraethyllead from most gasoline and by use of catalytic converters.

Water pollution caused by discharge of toxic chemical wastes is closely regulated by both the EPA and the FDA. Such substances are defined in the 1972 amendment of the Federal Water Pollution Control Act as those "which will cause death, disease, cancer, or genetic malfunctions in any organisms with which they come into contact." Substances added to water for purification purposes (chlorine, aluminum sulfate, etc.) are excluded from the category of pollutants.

See also Environmental Protection Agency, air pollution, water pollution.

polonium. Po. Radioactive element of atomic number 84, member of group VIA of the periodic table, aw 210, valences = 2, 4, 6. There are no stable isotopes. Polonium is a member of the uranium natural radioactive-decay series, occurring naturally in uranium-bearing ores; it is produced artificially by bombarding bismuth with neutrons. It has been identified in cigarette smoke. Properties: Similar to those of tellurium, mp 254°C, bp 962°C, d 9.4, dissolved by concentrated sulfuric and nitric acids and aqua regia and by dilute hydrochloric acid.

Hazard: Dangerous radioactive poison.

Use: Source of α -radiation and neutrons, instrument calibration, oil-well logging, moisture determination, power source.

See smoke (4).

Polonovski reaction. Demethylation of tertiary (or heterocyclic) amine N-oxides on treatment with acetyl chloride or acetic anhydride to give N-acetylated secondary amines and formaldehyde, along with O-acetylated aminophenols as a result of a side reaction.

poly- A prefix signifying many. For example, a polymer is an aggregate formed by combination of a number of single molecules.

See polymer, high.

"Polyac" [Du Pont]. TM for a butyl rubber conditioner containing 25% poly-p-dinitrosobenzene ($\text{C}_6\text{H}_4(\text{NO})_2$), with an inert wax. Dark brown, waxy pellets; d 0.96.

Use: Processing aid and accelerator of vulcanization for butyl rubber.

polyacetal. See acetal resin.

polyacetylene. A linear polymer of acetylene having alternate single and double bonds, developed in 1978. It is electrically conductive, but this property can be varied in either direction by appropriate doping either with electron acceptors (arsenic pentafluoride or a halogen) or with electron donors (lithium, sodium). Thus, it can be made to have a wide range of conductivity from insulators to n- or p-type semiconductors, to strongly conductive forms. Polyacetylene can be made in both *cis* and *trans* modifications in the form of fibers and thin films, the conductivity of the fibers increasing with their degree of orientation. Films can be applied on glass or metal substrates. Though still in an experimental stage, these polymers have significant possibilities for industrial applications, e.g., in batteries. See also cyclooctatetraene.

polyacrylamide. $(\text{CH}_2\text{CHCONH}_2)_n$. White solid, water-soluble high polymer.

Derivation: Polymerization of acrylamide with N,N'-methylene bisacrylamide.

Use: Thickening agent, suspending agent, additive to adhesives. Permissible food additive.

See also acrylic resin.

polyacrylate. See acrylic resin.

polyacrylic acid. See acrylic acid; methacrylic acid.

polyacrylonitrile. A polymer of acrylonitrile which is the basic material used in the manufac-

"ACRIVIOLET"

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"Acriviolet" [Allied-Signal]. TM for a dye mixture used as an oral antiseptic.

acroleic acid. See acrylic acid.

acrolein. (2-propenal; acrylaldehyde; allyl aldehyde; acraldehyde). CAS: 107-02-8. CH_3CHCHO .



Properties: Colorless or yellowish liquid; disagreeable, choking odor. Soluble in water, alcohol, and ether. Polymerizes readily unless inhibitor (hydroquinone) is added. Very reactive. Bp 52.7°C, mp -87.0°C, d 0.8427 (20/20°C); bulk d 7.03 lb/gal (20°C); flash p below 0°F (-17°C) (COC). Autoign temperature 532°F (277°C).

Derivation: (1) Oxidation of allyl alcohol or propylene; (2) by heating glycerol with magnesium sulfate; (3) from propylene with bismuth-phosphorus-molybdenum catalyst.

Method of purification: Rectification.

Grade: Technical.

Hazard: Very irritant to eyes and skin; toxic by inhalation and ingestion. TLV: 0.1 ppm in air. Dangerous fire risk. Explosive limits in air 2.8 to 31%.

Use: Intermediate for synthetic glycerol, polyurethane and polyester resins, methionine, pharmaceuticals; herbicide; warning agent in gases.

acrolein dimer.
(2-formyl-3,4-dihydro-2H-pyran).



Properties: Liquid, d 1.0775 (20°C), bp 151.3°C, sp -100°C, flash p 118°F (47.7°C) (OC), bulk d 8.96 lb/gal (20/20°C), soluble in water. Combustible.

Hazard: Moderate fire risk.

Use: Intermediate for resins, pharmaceuticals, dyestuffs.

"Acronal" [BASF]. TM for dispersions, solutions and solids of acrylate homo- and copolymers.

ACR process. Abbreviation for advanced cracking reactor.
See ethylene.

acrylaldehyde. See acrolein.

acrylamide. CAS: 79-06-1. $\text{CH}_2\text{CHCONH}_2$.
Properties: Colorless, odorless crystals; mp 84.5°C; bp 125°C (25 mm Hg); d 1.122 (30°C); soluble in water, alcohol, acetone; insoluble in benzene,

heptane. The solid is stable at room temperature but may polymerize violently on melting.
Derivation: Reaction of acrylonitrile with sulfuric acid (84.5%) and neutralization.

Grade: Technical (approximately 97% pure).

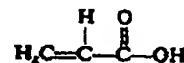
Hazard: Toxic by skin absorption. Irritant to skin and mucous membranes. TLV: 0.03 mg/m³ of air, suspected of carcinogenic potential for humans, toxic by skin absorption.

Use: Synthesis of dyes, etc.; cross-linking agent; adhesives; paper and textile sizes, soil conditioning agents; flocculants; sewage and waste treatment; ore processing; permanent-press fabrics.

acrylate. (1) Any of several monomers used for the manufacture of thermosetting acrylic surface coating resins, e.g., 2-hydroxyethyl acrylate (HEA) and hydroxypropyl acrylate (HPA).

(2) Polymer of acrylic acid or its esters, used in surface coatings, emulsion paints, paper and leather finishes, etc. See also acrylic acid; acrylic resin.

acrylic acid. (acroleic acid; propenoic acid).
CAS: 79-10-7. $\text{H}_2\text{C:CHCOOH}$.



Properties: Colorless liquid; acrid odor. Polymerizes readily. Miscible with water, alcohol, and ether; bp 140.9°C; mp 12.1°C; d 1.052 (20/20°C), vap press 3.1 mm Hg (20°C); bulk d 8.6 lb/gal (20°C); refr index 1.4224 (20°C); flash p 130°F (54.5°C) (OC). Combustible.

Derivation: (1) Condensation of ethylene oxide with hydrocyanic acid followed by reaction with sulfuric acid at 320°F; (2) acetylene, carbon monoxide, and water, with nickel catalyst; (3) propylene is vapor-oxidized to acrolein, which is oxidized to acrylic acid at 300°C with molybdenum-vanadium catalyst; (4) hydrolysis of acrylonitrile.

Grade: Technical (esterification and polymerization grades); glacial (97%).

Hazard: Irritant and corrosive to skin. Toxic by inhalation. May polymerize explosively. TLV: 2 ppm in air.

Use: Monomer for polyacrylic and polymethacrylic acids and other acrylic polymers. See acrylic resin.

acrylic fiber. A manufactured fiber in which the fiber-forming substance is any long-chain synthetic polymer composed of at least 85% by weight of acrylonitrile units $-\text{CH}_2\text{CH}(\text{CN})-$ (Federal Trade Commission).

Properties: Tensile strength, 2-3 g/denier; water absorption 1.5-2.5%; d approximately 1.17.
Hazard: Fumes are toxic. Combustible.

AMERICAN SOCIETY OF PHARMACOLOGY 52

source of voluntary consensus standards. The society operates via more than 125 main technical committees which function in prescribed fields under regulations that ensure balanced representation among producers, users, and general-interest participants. Headquarters of the society is at 655 15th St. Washington, DC 20005.

American Society of Pharmacology and Experimental Therapeutics. (ASPET).

It was founded in 1908 and has over 3700 members. It is a scientific society of investigators in pharmacology and toxicology interested in research and promotion of pharmacological knowledge and its use among scientists and the public. The address is 9650 Rockville Pk., Bethesda, MD 20814.

americium. Am. A synthetic radioactive element of atomic number 95, a member of the actinide series. Atomic weight 241; 14 isotopes of widely varying half-life. Valence 3, but divalent, tetravalent, and higher valencies exist. Alpha and gamma emitter, forms compounds with oxygen, halides, lithium, etc. Metallic americium is silver-white crystalline, d 13.6, mp approximately 100C. Half-life of ^{241}Am is 458 years.

Derivation: Multiple neutron capture in plutonium in nuclear reactors, plutonium isotopes yield ^{241}Am and ^{243}Am on beta decay. The metal is obtained by reduction of the trifluoride with barium in a vacuum at 1200C.

Hazard: A radioactive poison.

Use: Gamma radiography, radiochemical research, diagnostic aid, electronic devices.

"Amerlate" phosphorus [Amerchol]. TM for the isopropyl ester of hydroxy, normal and branched chain acids of lanolin. A light yellow, soft solid that liquefies on contact with the skin. A hydrophilic emollient, moisturizer, conditioning agent, lubricant, pigment dispersant, and nonionic auxiliary without emulsifier.

"Amsall DMC-287" [Amerchol].

TM for emollient.

Use: Stabilizer, plasticizer, and lubricant.

Ames dial. A device used for measuring the thickness of paint film.

amethopterin. See methotrexate.

amiben. Generic name for 3-amino-2,5-dichlorobenzoic acid. $\text{C}_6\text{H}_3\text{NH}_2\text{Cl}_2\text{COOH}$.

Use: Herbicide or plant growth regulator.

amide. A nitrogenous compound related to or derived from ammonia. Reaction of an alkali

metal with ammonia yields inorganic amides, e.g., sodium amide (NaNH_2). Organic amides are characterized by an acyl group ($-\text{CONH}_2$) usually attached to an organic group ($\text{R}=\text{CONH}_2$); formamide (HCONH_2) and carbamide (urea) [$\text{CO}(\text{NH}_2)_2$] are common examples.

See also polyamide.

amidnomycin. $\text{C}_9\text{H}_{15}\text{N}_4\text{O}$. An antibiotic which partially inhibits spore-forming bacteria.

4-amidino-1-(nitrosaminoamidino)-1-tetrazene.
See tetrazene.

amidol. See 2,4-diaminophenol hydrochloride.

amidopropylamine oxide.

Use: Foamer, foam booster, foam stabilizer; scour for household, cosmetic, and industrial applications.

aminacrine hydrochloride. USAN name for 9-amino-acridine hydrochloride.

amination. The process of making an amine (RNH_2). The methods commonly used are (1) reduction of a nitro compound and (2) action of ammonia on a chloro, hydroxy, or sulfonic acid compound.

amine. A class of organic compounds of nitrogen that may be considered as derived from ammonia (NH_3) by replacing one or more of the hydrogen atoms with alkyl groups. The amine is primary, secondary, or tertiary depending on whether one, two, or three of the hydrogen atoms are replaced. All amines are basic in nature, and usually combine readily with hydrochloric or other strong acids to form salts.
See also fatty amine.

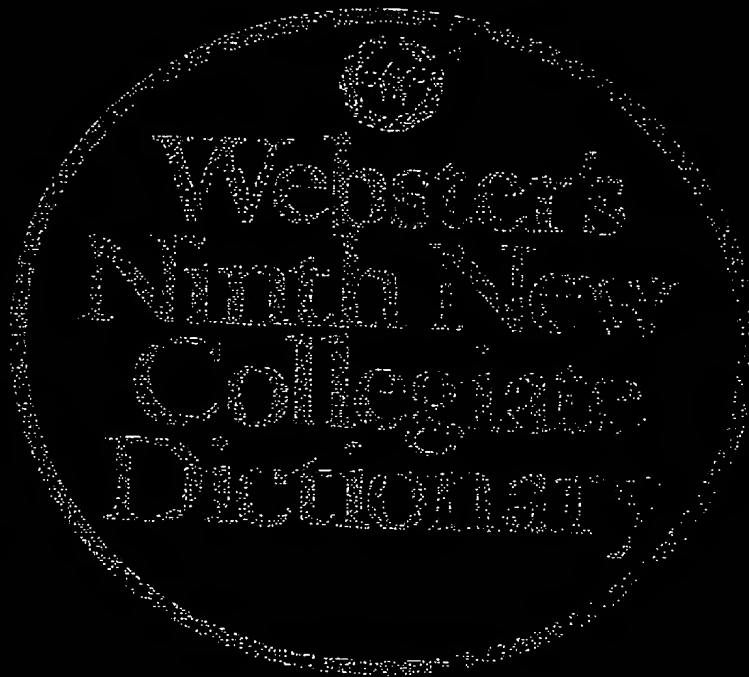
amine 220. 2-(8-heptadecenyl)-2-imidazoline-1-ethanol).

$\text{C}_{17}\text{H}_{33}\text{C}(\text{NC}_2\text{H}_4\text{NC}_2\text{H}_4\text{OH})$.

Properties: D 0.9330 (20/20C), bulk d 7.76 (20C) lb/gal, bp 235C (1 mm Hg), flash p 465F (240C). Combustible.

Use: Demulsifier used particularly in the recovery of tar from water-gas process emulsions. A powerful cationic wetting agent. Useful in flotation processes involving siliceous minerals and the formation of emulsions and dispersions under acidic conditions.

amine 248. Dark-colored liquid or paste consisting of a non-volatile amine mixture with bis-(hexamethylene)triamine and its homologs as principal components. Disperses readily in water.



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